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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/073,503   | 02/11/2002  | Dan Lillie           | GD7345US            | 5980             |
| 22203  | 7590        | 05/24/2004           | EXAMINER            |                  |
| KUSNER & JAFFE<br>HIGHLAND PLACE SUITE 310<br>6151 WILSON MILLS ROAD<br>HIGHLAND HEIGHTS, OH 44143 |             |                      | CULBERT, ROBERTS P  |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1763                |                  |

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |                                      |  |
|------------------------------|--------------------------------------|--------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/073,503 | <b>Applicant(s)</b><br>LILLIE ET AL. |  |
|                              | <b>Examiner</b><br>Roberts Culbert   | <b>Art Unit</b><br>1763              |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 May 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15-18, 20, 22, 23 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-18, 20, 22, 23, and 26-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### ***Response to Arguments***

Applicant's arguments filed 5/3/04 have been fully considered but they are not persuasive.

Applicant has argued that *"the Examiner has not combined two compositions...but rather has taken the composition disclosed in Abolafia et al. '197 and combined it with a single element (i.e., glycerin) that is but one component of the etching solution disclosed in Abolafia et al. '691. It is respectfully submitted that, it is only with hindsight reconstruction that a single element of Abolafia et al '691 would be combined with the etching solution disclosed in Abolafia et al. '197"*

The argument is not persuasive because the examiner has not, as applicant suggests, simply combined a single element of Abolafia '691 with the composition of Abolafia '197. The obviousness rejection is based upon combining every element of the individual compositions. Note that the combined composition contains all of the elements of the compositions taught in Abolafia et al. '197 and Abolafia et al. '691.

Applicant has further argued that *"While Abolafia et al. '197 references Abolafia et al. '691, nowhere does it teach or suggest that it would be obvious to selectively take the glycerin disclosed in Abolafia et al. '691 and use it in combination with the etching solution taught in Abolafia et al. '197 (comprised of hydrochloric acid and thiourea)."*

The argument is not persuasive because the obviousness rejection does not rely on a suggestion in Abolafia et al. '197 to combine with Abolafia '691, but is based upon the principle that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

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Claims 15-18, 20, 22, 23, and 26-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 recites the limitation "*wherein said hydrochloric acid is in a range of 5 volume% to 95 volume%*". Since no concentration or weight% is provided for the acid, it cannot be determined how much acid is added to the etchant.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 15-18, 20, 22, 23, and 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of U.S. Patent 4,370,197 to Abolafia et al. and U.S. Patent 4,160,691 to Abolafia et al.**

The admitted prior art (See Background of the Invention) teaches that it is known to form an embedded resistor from a resistive foil bonded to a dielectric layer (See Paragraph 3). The foil comprises a resistive material (a Ni/Cr alloy) on a copper foil. The foil is sequentially etched first with a copper

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etchant (*it may be assumed that this step forms trace lines in the well known manner so that resistors are formed*) and then with an etching solution to remove Ni/Cr without attacking the copper (See Paragraph 4). Applicant further admits that acidic chromium etching solutions are preferred for etching Ni/Cr alloys. Applicant teaches that one known solution for etching (U.S. Patent 4,160,691) comprises hydrochloric acid and glycerin.

The admitted prior art does not teach an etching solution for chromium or a Ni/Cr alloy comprising hydrochloric acid and thiourea.

U.S. Patent 4,370,197 to Abolafia et al. ('197) teaches a solution for etching a chromium layer without etching an adjacent copper layer comprising hydrochloric acid (Col. 3, Lines 24-29) and thiourea. (Col. 3, Lines 48-50) Abolafia teaches that the thiourea is in the range of 1-10% by weight.

It would have been obvious to one of ordinary skill in the art at the time of invention to etch the resistive Ni/Cr alloy layer described in the admitted prior art using an etching solution comprising hydrochloric acid and thiourea.

Since it is known in the art that acidic chromium etching solutions are preferred for etching Ni/Cr alloys, and that a solution comprising hydrochloric acid and thiourea is suitable for etching a chromium layer without attacking an adjacent copper layer, one of ordinary skill in the art would have been motivated at the time of invention to use an etching solution comprising hydrochloric acid and thiourea to remove the Ni/Cr layer of the resistive foil in order to etch a Ni/Cr layer without significantly etching an adjacent copper layer.

The admitted prior art in view of U.S. Patent 4,370,197 to Abolafia does not teach an etching composition further comprising glycerin.

U.S. Patent 4,160,691 to Abolafia ('691) teaches a composition for selectively etching chromium in the presence of an adjacent copper layer comprising hydrochloric acid and glycerin. (See Abstract)

It would have been prima facie obvious to one of ordinary skill in the art at the time of invention to etch the resistive Ni/Cr alloy layer described in the admitted prior art using an etching solution further comprising glycerin as recited in Claim 15.

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MPEP 2144.06 states "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art."

Abolafia ('691) teaches that the glycerin is in the range 65-95% by volume. (Col. 1, Lines 58-64)

Regarding the limitation of volume% for hydrochloric acid, the volume % claimed may not be compared to Abolafia ('197) since a concentration for the acid is not provided as discussed above, however, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the known result-effective variables such as concentration through routine experimentation.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

Furthermore, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]ere the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Regarding Claim 16, Official Notice is taken of the fact that it is notoriously old and well known in the art of etching thin film metals to use a photoresist to define portions of the thin film to be etched by protecting selected portions of the thin film. Abolafia ('197) also teaches this conventional feature. (Col. 1,

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lines 41-60) It would have been obvious to one of ordinary skill in the art at the time of invention to use a photoresist to define the trace lines in the well-known manner.

Regarding Claims 17 and 18, Since the etchant employed is known to etch chromium or a Ni/Cr alloy without etching copper, and the same portions of the copper layer and Ni/Cr layer are typically removed to form resistors, It would have been obvious to one of ordinary skill in the art at the time of invention that the photoresist may be removed prior to the etching of the resistive layer since the remaining copper layer will serve as a mask to protect portions of the resistive layer below.

Regarding Claim 20, the volume % claimed may not be compared to Abolafia ('197) since a concentration for the acid is not provided as discussed above, however, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the known result-effective variables such as concentration through routine experimentation.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

Furthermore, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]ere the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).



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Regarding Claims 22 and 23, Abolafia ('197) teaches that the thiourea is in the range of 1-10% by weight, but does not teach that the thiourea is in the range of 1-20ppm or 1-2ppm.

It would have been obvious to one of ordinary skill in the art at the time of invention to optimize the known result-effective variables such as concentration through routine experimentation.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

Furthermore, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]ere the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Regarding Claims 27 and 28, Abolafia ('197) teaches that the solution further comprises water sufficient to make up 100% of the volume total. See Example. It may be reasonably assumed that hydrochloric acid would be prepared with water in a similar manner as this step is entirely conventional in the art. Abolafia ('691) also teaches that the solution further comprises water sufficient to make up 100% of the volume total. (Col. 1, Lines 58-64)



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Regarding Claim 26, Abolafia ('691) teaches that the glycerin is in the range 65-95% by volume (Col. 1, Lines 58-64), but does not teach that the glycerin is about 46 volume%.

It would have been obvious to one of ordinary skill in the art at the time of invention to optimize the known result-effective variables such as concentration through routine experimentation.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003).

Furthermore, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]ere the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

Regarding Claims 29-31, Abolafia ('691) teaches that the solution is at a temperature in the range of 50°C (122°F) to 95°C (203°F). Abolafia ('197) teaches that the solution is at a temperature in the range of 50°C (122°F) up to the boiling point of the solution. (Col. 4, Lines 5-7)

### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

R. Culbert



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